

Inventions & Innovation Project Abstract

Improved Fuel Efficiency from Nanocomposite Tire Tread

HD silicas have several problems that have prevented their widespread adoption into the US tire market. While HD silica can improve rolling resistance and traction, they can decrease durability. Silicas for tire applications must have very high surface areas and are more expensive than carbon black. The coupling agents (which are used to modify the surface of the silica to be compatible with tire tread rubber) are also costly and can complicate processing. While Green Tires are commercially available in the US, retail prices are nearly double the price of a standard non-silica tire.

TDA Research, Inc. (TDA) has developed a proprietary, inexpensive nanometer-sized additive that could lead to a new tread material with lower rolling resistance at low cost. Their nanoparticle additives are based on a high purity, inorganic mineral whose surface can be easily modified for compatibility with a wide range of polymers. TDA Research, Inc has shown that they can disperse their nanoparticles in bromobutyl rubber (used as inner liners for tubeless automotive tires) and lower energy losses to hysteresis. Up to 90 percent of the rolling resistance in a tire comes from hysteresis losses, and our nanoparticles should show similar effects when dispersed in the styrene-butadiene-styrene (SBS) rubber used for tire tread.



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